ECE 375 Lab 3 Challenge

Introduction to AVR Simulation with Atmel Studio

Lab Time: Friday 4 - 6

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CHALLENGE

The FUNCTION subroutine featured in the sample code accepts two 16-bit values as parameters, and also returns a 16-bit value as its result. To complete the challenge for this lab, provide detailed answers to the following questions:

1. What type of operation does the FUNCTION subroutine perform on its two 16-bit inputs? How can you tell? Give a detailed description of the operation being performed by the FUNCTION subroutine.

   Per the instruction set, the 16-bit inputs are loaded sectionally onto the addressing registers, indicated by X,Y, and Z. Specifically, these will become loaded as immediate onto high and low register points for each, as in order to store the 16 bit addresses it must store respective 8 bit portions into the high and low portions. Now, as for the way the inputs are used is that they are stored into the address registered, and then referenced when doing an add with carry operation when storing the bits into the registers set at the top of the program. Arithmetic is performed on the dereferenced values, and then stored back into the address, where a branch might be used if there was a carry bit involved

2. Currently, the two 16-bit inputs used in the sample code cause the "brcc EXIT" branch to be taken. Come up with two 16-bit values that would cause the branch NOT to be taken, therefore causing the "st Z, XH" instruction to be executed before the subroutine returns.

   16 bit values 0x0000 and 0x0000 would not cause this branch to execute

3. What is the purpose of the conditionally-executed instruction "st Z, XH"?

   In the case that is the carry in the addition with carry operation, the value of X high will not move into the Z address. This is branched if this is the case after the arithmetic operation.